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Protecting SPACE in a Contested and Congested Domain

Our Nation is in a period of “persistent conflict” where we are confronted by state, non-state, and individual players who are not constrained from using violence to achieve their goals. The Army has a role in dealing with this persistent conflict: “to prevail in protracted counterinsurgency campaigns; engage to help other countries build capacity and assure friends and allies; support civil authorities at home and abroad; and deter and defeat hybrid threats and hostile state actors.”¹ Today’s military is increasingly reliant on space-based assets to provide critical enablers for mission success, i.e., satellite communications, positioning, navigation and timing, and intelligence, surveillance, and reconnaissance, just to name a few. If our space systems are ambushed, how do we quickly understand what happened and react? How will the Army prevail in a denied, degraded, disrupted space operational environment (D3SOE)?² Determining the answers to those questions is a critical task for every FA40 Space Operations Officer and space Enabler.

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Why is this a critical task? Space is clearly a contested and congested domain. Consider these reports:

- North Korea has detonated a nuclear weapon underground and is testing missiles that could someday carry nuclear warheads. Iran says their nuclear ambitions are for peaceful energy purposes, but they resist inspections to verify their claims. The electro-magnetic pulse from a nuclear warhead aboard a missile could disable our satellites along with those of our allies.
- China disavowed its air force commander Xu Qiliang's statement last fall that called the militarization of space a "historical inevitability."³ Yet, China has recently demonstrated a proven anti-satellite capability.
- Aside from a direct threat from a nation-state, American on-orbit technology faces threats from debris and out-of-control satellites like the defunct Russian satellite that smashed into and destroyed an Iridium satellite in February 2009.
- Since the cyber domain links space assets to the ground, and because that domain inherently relies upon space assets as a component of Department of Defense networks, we must acknowledge the threat our systems, networks, and forces face in this realm. Reports from the Government Accountability Office, other reports to Congress, and statements by the commander, U.S. Strategic Command assert that the country's commercial, private and government sectors are constantly under cyber attack and the number of attacks on our networks continue to grow: from 24,097 attacks in 2007 to 72,065 in 2008.⁴ These attacks come "from the least sophisticated – what I would say the bored teenager – all the way up to the sophisticated nation-state, with some petty criminal elements sandwiched in between," says Gen. Kevin Chilton, Commander, U.S. Strategic Command.⁵

Because of the threats to on-orbit assets and the challenges facing Army forces in D3SOE, the Chief of Staff of the Army listed this as one of the Army's Title 10 Wargame Unified Quest 2010 key tasks: "Determine how to protect or mitigate the loss of space, cyber, and network-related capabilities." To that end, U.S. Army Space and Missile Defense Command/Army Forces Strategic Command's Future Warfare Center Wargames Division launched a series of events to feed into Unified Quest 2010 which will be held at Carlisle Barracks this May. The results of each of these events will be published in this and future Army Space Journals. The final reports will lead to a better understanding of the space dependencies and vulnerabilities of strategic and tactical warfighters and will identify mitigation strategies in a denied, degraded, disrupted space operational environment to ensure delivery of critical enablers.

What follows are preliminary findings from the first two events.

In December 2009 the USASMDC Future Warfare Center Wargames Division met with Soldiers assigned to 4th Infantry Division and 10th Special Forces Group to gain insight into how warfighters use space. Who better to know how they and their units are impacted by access, or non-access, to space-based capabilities than recently returned Soldiers who had been directly engaged in ground force missions. Not surprisingly, in this Warfighter Forum these warriors identified satellite communications and positioning, navigation and timing as their most critical space-based capabilities along with assured access to space capabilities. (Read the full report starting at page 34).

The findings from the Warfighter Forum were incorporated into the most recent event this past February called the Space Power Seminar Wargame on D3SOE. This seminar brought together senior FA40s; reps from the intelligence community, U.S. Army Training and Doctrine Command, and the signal community; senior advisors; and representatives from industry. Their task was to understand the Warfighters' space needs, dependencies, and vulnerabilities and then identify strategies to prevent or mitigate the loss of space, Cyber or network-related capabilities. The findings and recommendations from this will be rolled into Unified Quest 2010 to be tested and validated.

In his article on the 21st Century Army⁶, the Army Chief of Staff GEN George W. Casey Jr writes that land forces need to be versatile, tailorable, networked, and trained and ready for full spectrum operations. When the Army Chief of Staff talks about versatility, he is referring to being capable of operating across the spectrum of conflict. We must ask ourselves whether our units, be they space, infantry, field artillery, etc, are versatile enough to go from extensive reliance on space capabilities to a situation where they must continue to operate in an environment where space enabled capabilities are severely degraded or do not exist. I suggest we have a long way to go.

As we wait for the published results of this wargame series, members of our space community can implement at least one of the recommendations: train as we expect to fight. You can prepare your Soldiers, their units, and the ones they support to operate, survive, and win in a degraded, denied or disrupted space operational environment. To do this, Space Operations Officers and Space Enablers must understand exactly how their units rely on space. This is a critical task. Map the organization's use of space. Less battlespace – more time required to complete mission – more uncertainty – greater casualties – more fog of war) on your unit's ability to accomplish its mission essential tasks. The next step is to determine for each space system what the primary, alternate, contingency, and emergency backups, redundancies and pathways are and to develop solid battle drills using them which will allow

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your unit to complete the mission by working through D3SOE. You need to practice these drills at every opportunity. Take the time to work through the impacts and avoid the tendency to just acknowledge there is an impact and move on before a full assessment is accomplished.

Another recommendation: we should strongly advocate for robust, redundant capabilities in the ground, air, high altitude, space and cyber domains. Pushing for a multi-domain resilient solution to D3SOE is accomplished at the strategic level with tactical implications. However, today space officers can educate their unit commanders on this need and commanders can then call for action and support realistic training.

Some of these strategies and recommendations for dealing with D3SOE may be validated in Unified Quest 2010. Some may not. Regardless, finding, advocating and implementing the doctrinal, operational, training, leadership, materiel, personnel and facility solutions to D3SOE is going to be necessary for the 21st Century Army that GEN Casey challenges us to build.

Space is now a contested and congested domain and it will become even more so. The threats are present today and growing. And the time it takes for bad actors to access the network links between space and ground terminals and to disseminate their chaos continues to shrink as does the time we have to respond. In fact, that amount of time is approaching nil. FA40s and space enablers are empowered to be "change agents" in their units NOW! We simply cannot continue conducting business as usual; we must be proactive. The Army Space community is charged to prepare and train their units to prevail if and when enabling space capabilities are stripped away. The most critical task today for the space community is to take action to ensure that Army units can recognize when their enabling space assets have been interfered with and to quickly adapt and sustain operations in order to prevail in a denied, degraded or disrupted space operational environment.

Footnotes

¹ Casey, Jr., GEN George W., "The Army of the 21st Century," Army Magazine, October 2009

² We could add fourth "D" for destroyed space systems.

³ "Beijing 'opposed space arms race,'" Agence France-Presse, South China Morning Post, Nov 6, 2009

⁴ US Northern Command Special Security Office, Security News Letter, Vol 22, #4, April – June 2009.

⁵ Mills, Elinor, "US government spends over \$100M on cyberattack cleanup," CNET News.com, Apr 8, 2009 www.zdnetasia.com/news/security/0.39044215.62052979.00.htm

⁶ Casey, Jr., GEN George W., "The Army of the 21st Century," Army Magazine, October 2009

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information, rather than making the assumption that it will always be provided and present when they need it. At the same time the concept recognizes the increasing need and importance that the Army defend its own networks in order to generate and preserve combat power.

U.S. space-based capabilities are an increasingly attractive target to our adversaries; all leaders – not just Army space leaders – must understand that there will be periods of time when space-based capabilities and systems are actively denied or degraded. Despite the recognition of our vulnerability, Army leaders have been reluctant to train in a degraded space environment. Usually the loss of SATCOM or position, navigation and timing is simulated, accompanied by the rationale that training time is too valuable to waste and that we cannot afford to deny or degrade space-based capabilities as it would detract from the main training objective. Consequently leaders and Soldiers are not trained to operate in a degraded space environment. The Army Capstone Concept provides the opportunity and rationale for rethinking this necessary training. In order to operate in a degraded environment, Army forces and leaders need to develop mitigation plans and strategies beforehand in order to successfully fight through these inevitable degradations. Army training, to include rotations at the Combat Training Centers, needs to routinely include denied or degraded space-based capabilities. Soldiers and forces should be practicing operations without satellite communications or GPS signals. They need to learn how to rapidly recognize degraded capabilities and take action to mitigate their loss, in order to preserve operational adaptability in an uncertain and complex environment.

In conclusion, the new Army Capstone Concept emphasizes operational adaptability. Leaders at all levels must have a mindset that is flexible, and they must be comfortable with collaborative planning and decentralized execution. At the same time our Soldiers must be able to tolerate and operate within ambiguous situations, and possess the ability and willingness to make rapid adjustments according to the situation. Space-based capabilities and systems enable the concepts, training and systems that make operational adaptability possible. The new concept, rather than constraining space operations, provides U.S. Army Space and Missile Defense Command and Space Operation Officers a new opportunity and foundation challenging us to further emphasize, provide, and develop space-based capabilities within the Army. Operational adaptability is dependent upon space.

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